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Lee et al.

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(54) **MEDIA DEVICE WITH ENHANCED DATA RETRIEVAL FEATURE**

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(63) Continuation of application No. 14/512,255, filed on Oct. 10, 2014, now Pat. No. 9,094,141, which is a continuation of application No. 12/237,264, filed on Sep. 24, 2008, now Pat. No. 8,886,112.

(51) **Int. Cl.**

H04H 20/71	(2008.01)
H04H 60/37	(2008.01)
H04H 20/72	(2008.01)

(Continued)

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CPC ***H04H 60/372*** (2013.01); ***H04H 20/72*** (2013.01); ***H04H 60/73*** (2013.01); *H04H 60/74* (2013.01)

(58) **Field of Classification Search**

CPC ... H04H 60/74; H04H 60/37; H04H 2201/13; H04H 2201/10; H04H 20/40; H04H 60/73

USPC 455/466, 422.1, 403, 414.1–414.4, 455/550.1, 73, 500, 517, 412.1, 412.2, 455/426.1, 426.2; 725/62–72

See application file for complete search history.

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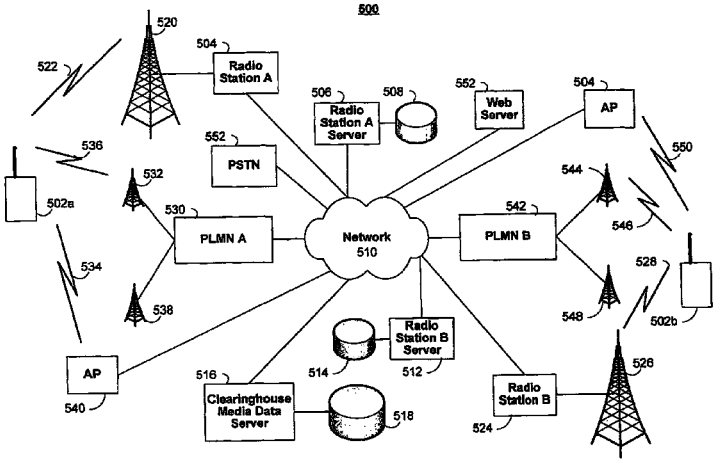
(57) **ABSTRACT**

A personal media device including a broadcast receiver that receives broadcast media and broadcast media data from a broadcast source where the broadcast media data includes a media identifier associated with the broadcast media. The media device also includes a data transceiver that sends a retrieval request to a media server for enhanced media data where the retrieval request includes the media identifier and receives the enhanced media data via a wireless data channel. The media device further includes a processor that performs a media device operation in response to the received enhanced media data.

20 Claims, 10 Drawing Sheets



(51) **Int. Cl.**

H04H 60/73	(2008.01)
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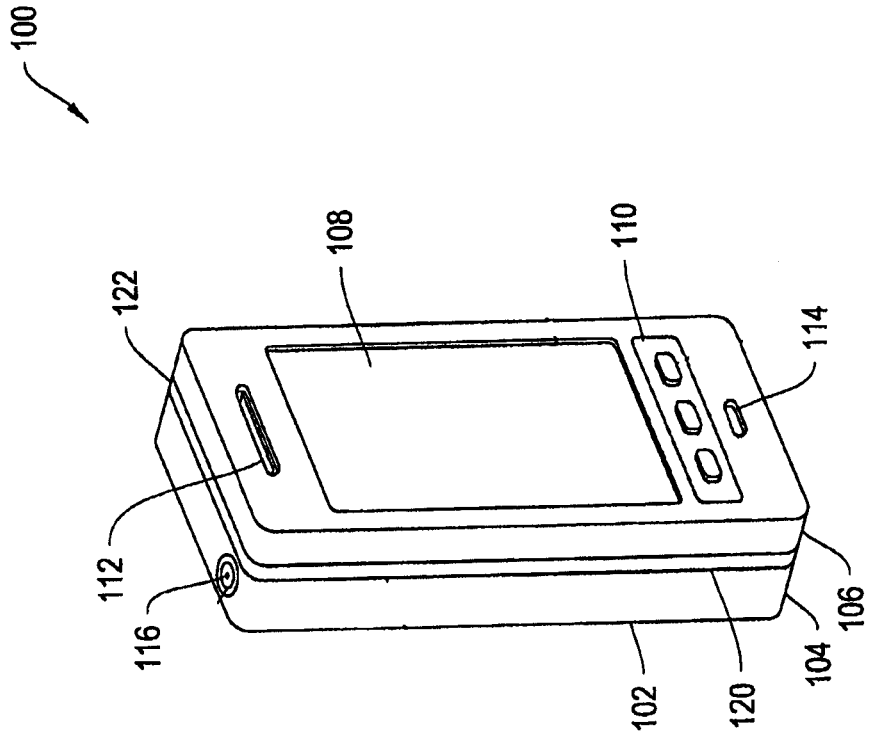

FIG. 1

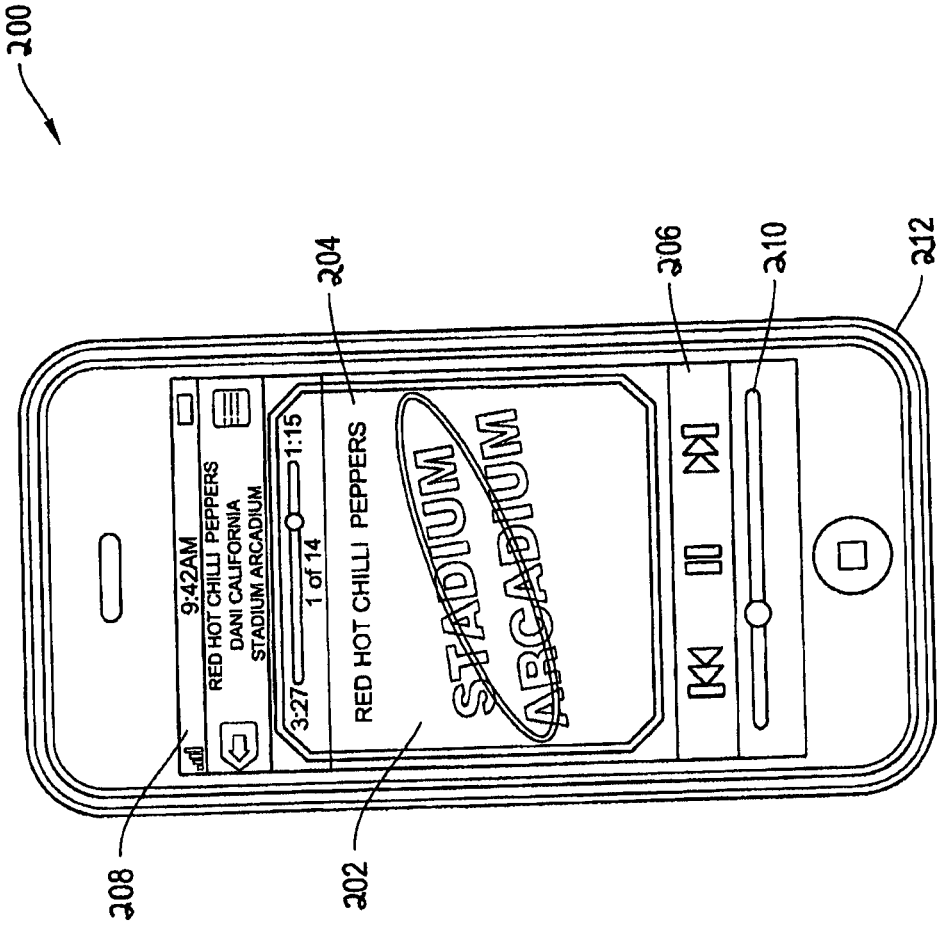
200
204
206
210
212
9:42AM
RED HOT CHILLI PEPPERS
DANI CALIFORNIA
STADIUM ARCADIUM
1:15
1 of 14
3:27
RED HOT CHILLI PEPPERS
STADIUM ARCADIUM
208
202

FIG. 2

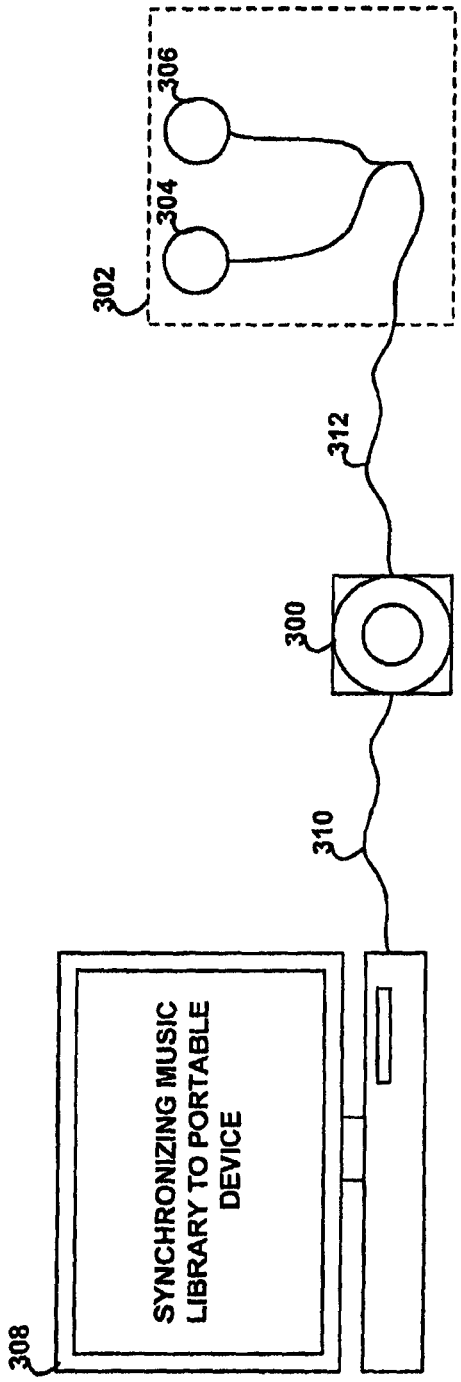
306
304
302
312
300
310
SYNCHRONIZING MUSIC LIBRARY TO PORTABLE DEVICE
308

FIG. 3

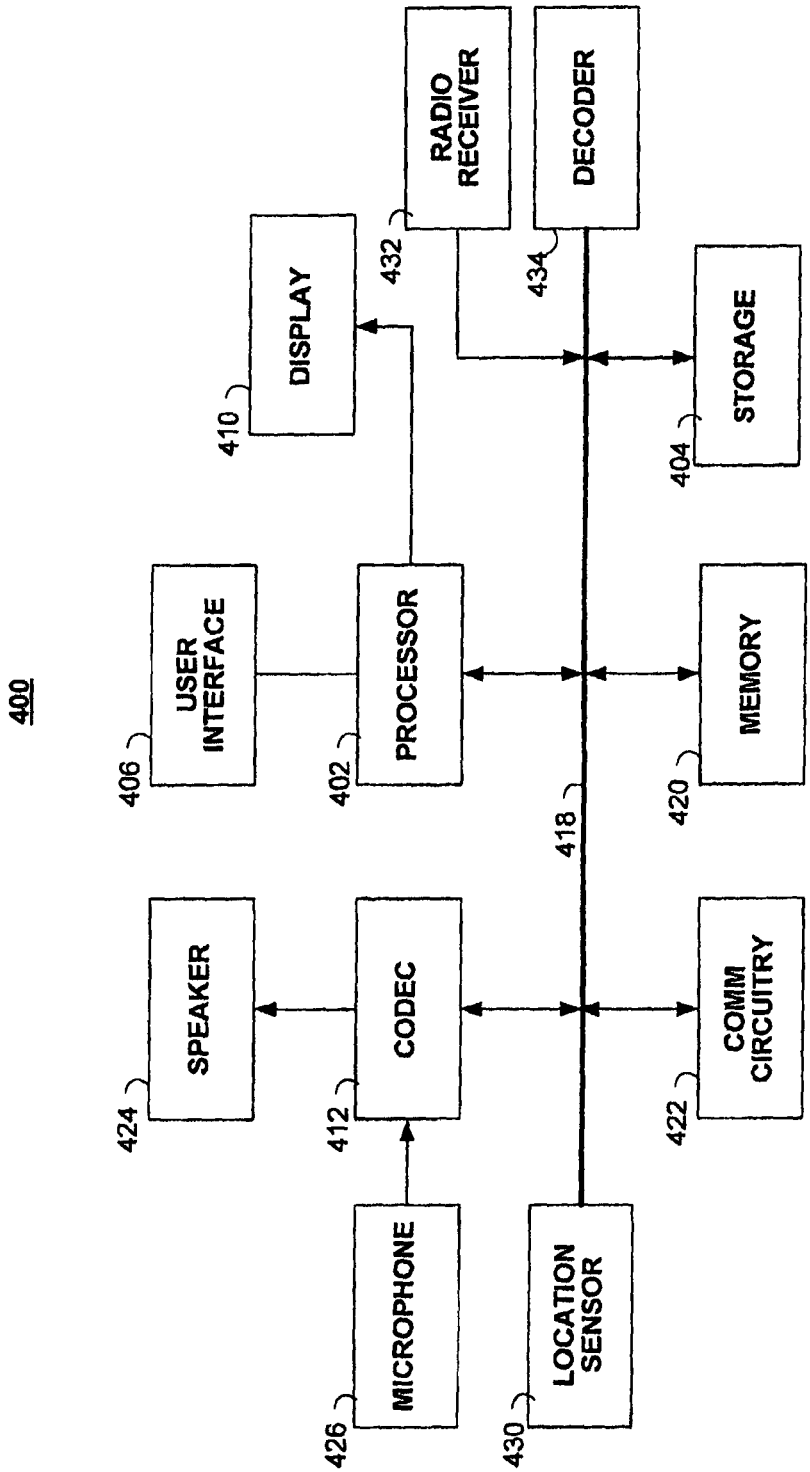
400
USER INTERFACE
406
PROCESSOR
402
DISPLAY
410
RADIO RECEIVER
432
DECODER
434
STORAGE
404
MEMORY
420
418
SPEAKER
424
CODEC
412
COMM CIRCUITRY
422
MICROPHONE
426
LOCATION SENSOR
430

FIG. 4

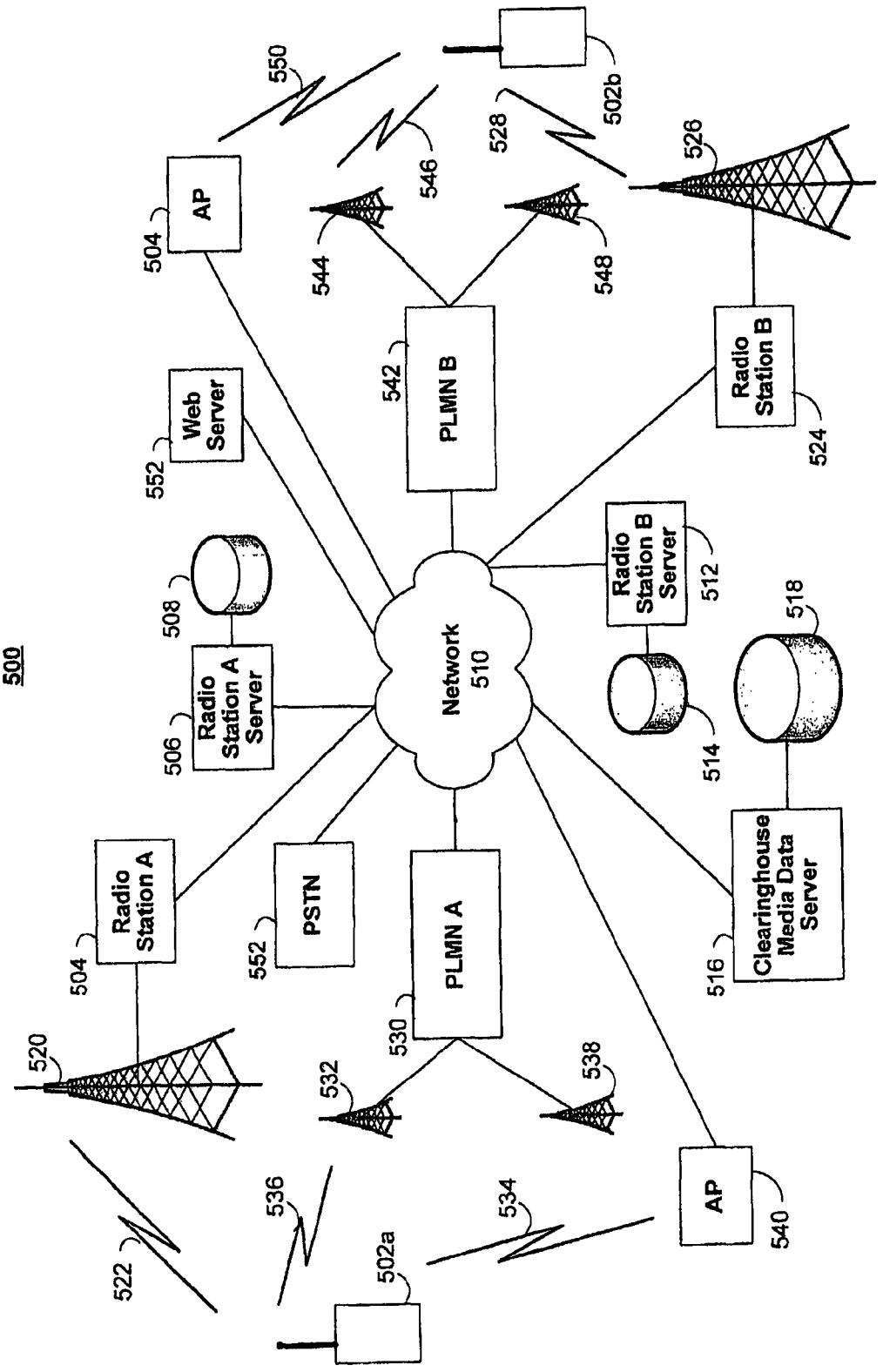
500
Network 510
AP 504
Web Server 552
Radio Station A Server 506
Radio Station A 504
PSTN 552
PLMN A 530
AP 540
Clearinghouse Media Data Server 516
Radio Station B Server 512
Radio Station B 524
PLMN B 542
AP 504
502a
502b
508
514
518
520
522
526
528
532
534
536
538
544
546
548
550

FIG. 5

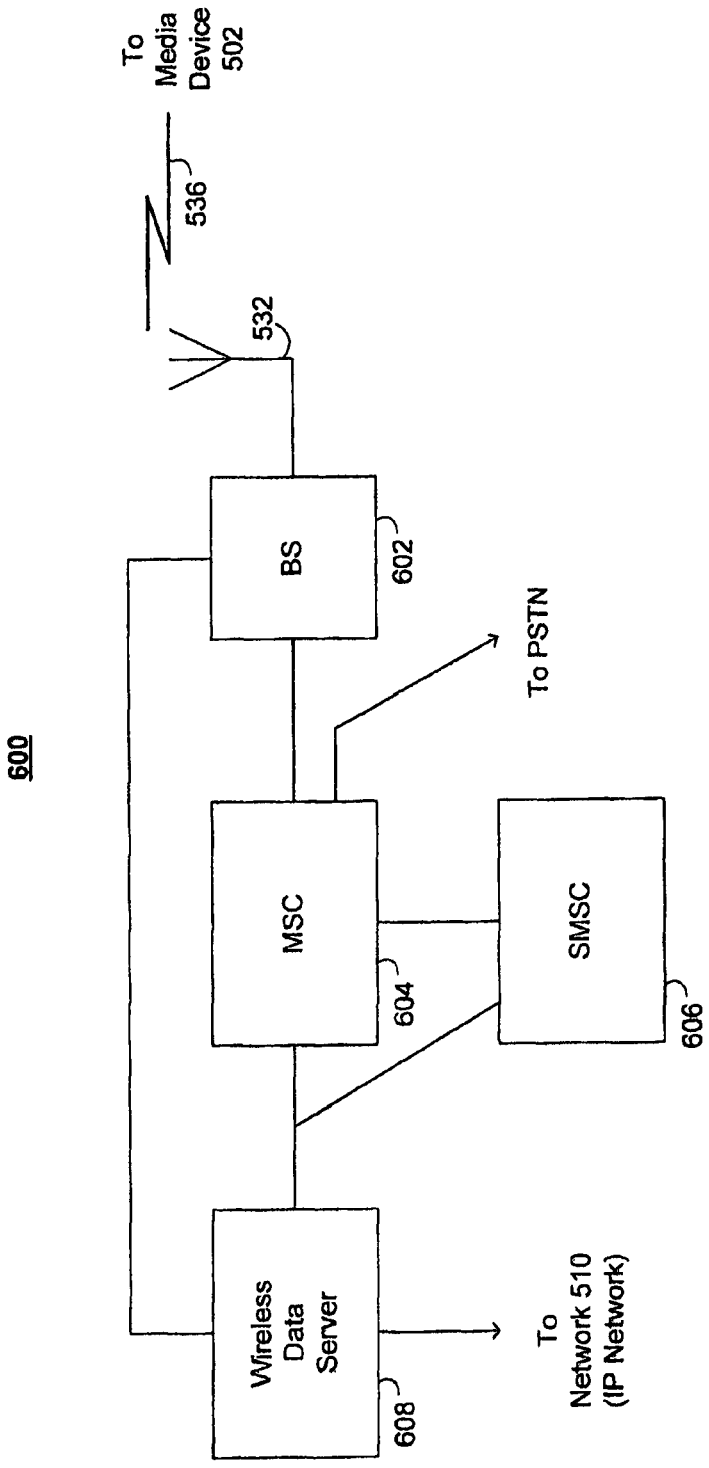
600
To Media Device 502
536
532
BS
602
To PSTN
MSC
604
SMSC
606
Wireless Data Server
608
To Network 510 (IP Network)

FIG. 6

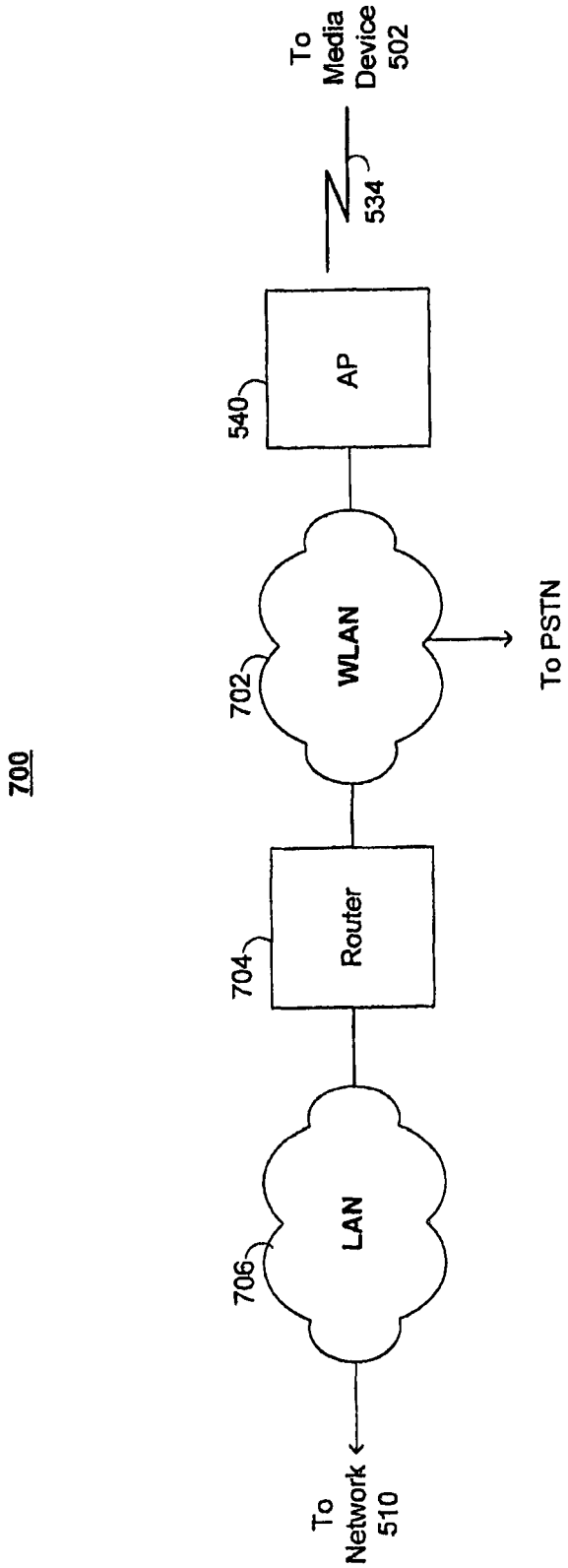
700
To Media Device 502
534
AP
540
WLAN
702
To PSTN
Router
704
LAN
706
To Network 510

FIG. 7

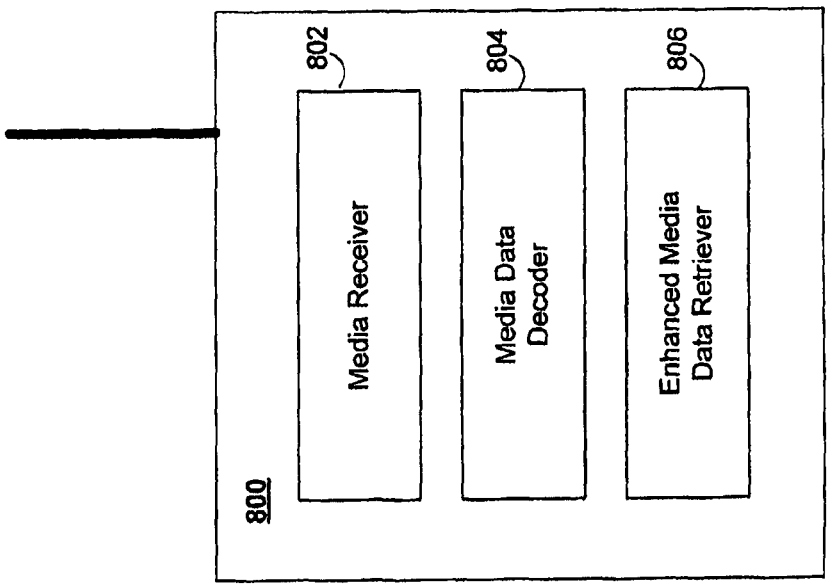
800
802
Media Receiver
804
Media Data Decoder
806
Enhanced Media Data Retriever

FIG. 8

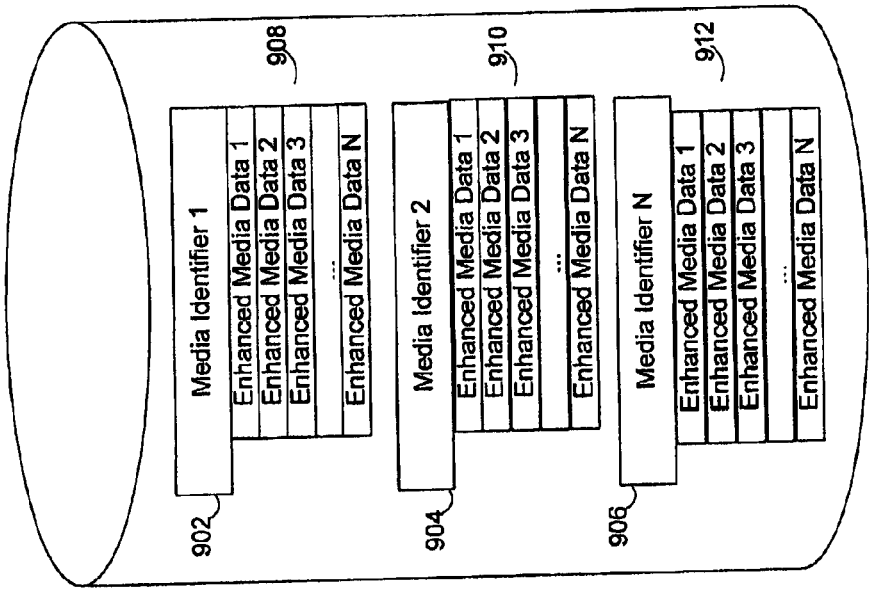
900
902
Media Identifier 1
Enhanced Media Data 1
Enhanced Media Data 2
Enhanced Media Data 3
...
Enhanced Media Data N
908
904
Media Identifier 2
Enhanced Media Data 1
Enhanced Media Data 2
Enhanced Media Data 3
...
Enhanced Media Data N
910
906
Media Identifier N
Enhanced Media Data 1
Enhanced Media Data 2
Enhanced Media Data 3
...
Enhanced Media Data N
912

FIG. 9

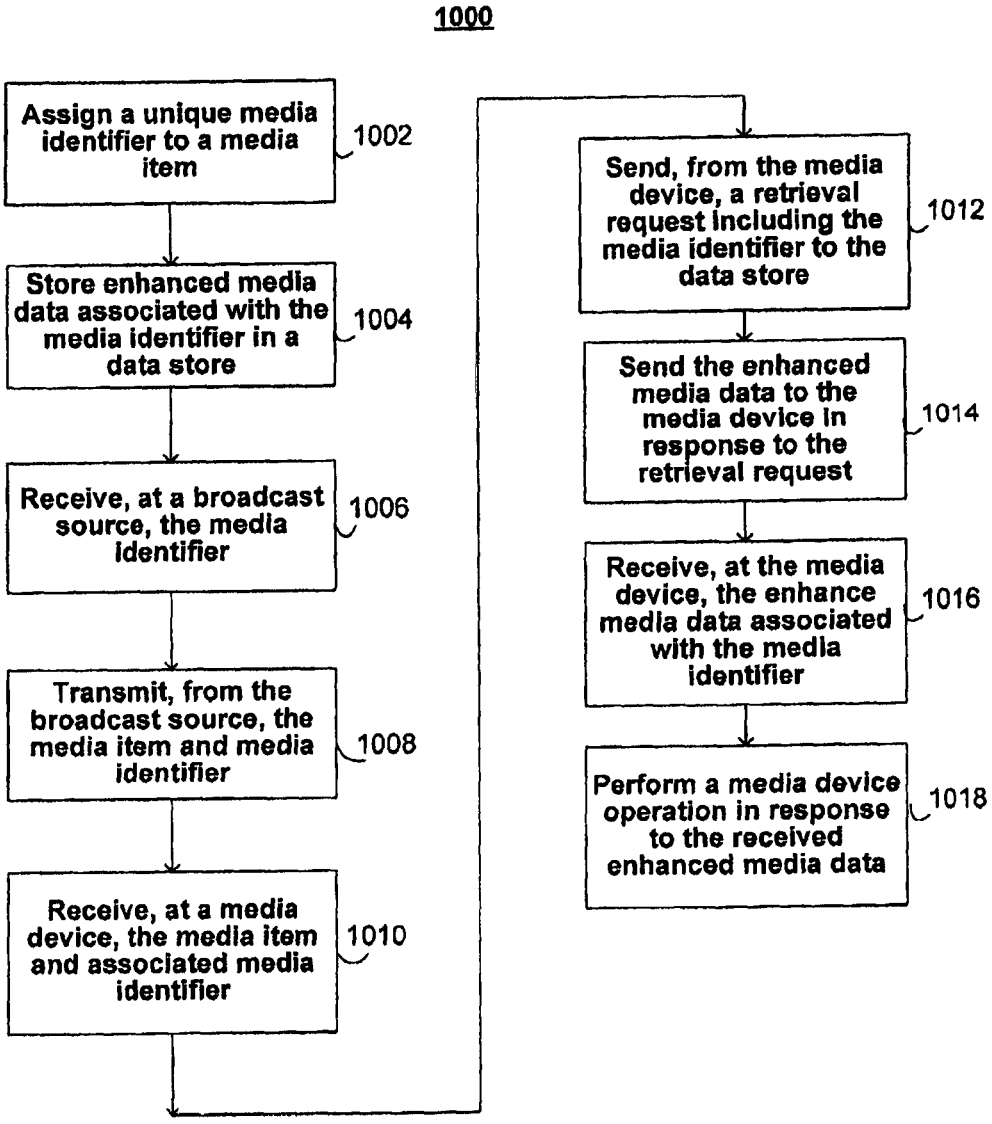
1000
Assign a unique media identifier to a media item
1002
Store enhanced media data associated with the media identifier in a data store
1004
Receive, at a broadcast source, the media identifier
1006
Transmit, from the broadcast source, the media item and media identifier
1008
Receive, at a media device, the media item and associated media identifier
1010
Send, from the media device, a retrieval request including the media identifier to the data store
1012
Send the enhanced media data to the media device in response to the retrieval request
1014
Receive, at the media device, the enhance media data associated with the media identifier
1016
Perform a media device operation in response to the received enhanced media data
1018

FIG. 10

MEDIA DEVICE WITH ENHANCED DATA RETRIEVAL FEATURE

REFERENCE TO RELATED APPLICATIONS

This application is a continuation of co-pending U.S. application Ser. No. 14/512,255 filed on Oct. 10, 2014, which is a continuation of U.S. application Ser. No. 12/237,264 filed on Sep. 24, 2008, now issued as U.S. Pat. No. 8,886,112, which is related to the following: U.S. patent application Ser. No. 12/237,247, filed on Sep. 24, 2008, and entitled "Systems, Methods, and Devices for Providing Broadcast Media from a Selected Source"; U.S. patent application Ser. No. 12/237,259, filed on Sep. 24, 2008, and entitled "Systems, Methods, and Devices for Retrieving Local Broadcast Source Presets"; and U.S. patent application Ser. No. 12/237,261, filed on Sep. 24, 2008, now issued as U.S. Pat. No. 8,452,228 and entitled "Systems, Methods, and Devices for Associating a Contact Identifier with a Broadcast Source." The entire contents of the above-referenced applications are incorporated herein by reference.

BACKGROUND

This invention relates to media devices having a broadcast radio receiver capable of receiving broadcast media along with broadcast media data and a transceiver capable of requesting and retrieving enhanced media data.

Traditional media devices, e.g., an MP3 player, typically connect with a headset to enable a user to listen to music. Other media devices may include a display that displays videos. Many types of media devices are portable and have compact form factors to enable efficient handling and use by a user. Certain media devices include a radio broadcast receiver capable of receiving amplitude modulated (AM), frequency modulated (FM), or satellite broadcast media. The media can typically include a song, video, news program, or radio show. Certain media devices, e.g., cellular telephones, include wireless transceivers capable of exchanging data with a public land mobile network (PLMN) or wireless data network that may be linked with the Internet or other data networks. Other media devices are capable of interfacing with personal area networks (PAN), wireless local area networks (WLAN), satellite data networks (SAN), and other data networks including, for example, Wi-fi (802.x) networks.

In addition to providing broadcast media (e.g., songs, video, television programs, and radio shows), certain broadcast media sources can supplement the broadcast media with broadcast media data. The broadcast media data can include media metadata (e.g., information about a particular song) or data about the broadcast source (e.g., the name of the broadcasting radio station).

The Radio Data System (RDS) is a communications standard developed by the European Broadcasting Union (EBU) that enables the transmission of small amounts of broadcast media data using FM radio broadcasts. RDS can send various types of broadcast media data including: time, track title, track artist, and station identification. RDS has been used in Europe and South America since the early 1990s.

The Radio Broadcast Data System (RBDS) is the name for the North American version of RDS, and is also often referred to simply as "RDS." The North American and European versions are nearly identical. Both RDS versions use a 57 kHz sub carrier to carry broadcast media data at 1187.5 bits per second.

One problem with using existing broadcast radio systems is that the broadcast media data is relatively small which limits the amount, quality, and types of media data that can practically be transmitted to a media device. For example, Radio Text (RT) provided by RDS is limited to 64-character text data. Thus, RT media data is typically limited to radio station slogans, song titles, or artist names. RDS cannot support the transmission of significantly larger amounts of enhanced media data for, for example, detailed graphics or video-based data. Accordingly, there is a need to enable a media device to retrieve significantly greater amounts of enhanced media data.

Another problem with existing broadcast radio systems is that the broadcast media data is not specific to a particular target media device. The broadcast provider provides the broadcast media data as, for example, RDS data that is available to all radio receivers. Unfortunately, different radio receivers or different media devices may have different capabilities or features. Also, the user of a particular media device may have a preference for a particular type of media data. Accordingly, there is a need to enable a media device to retrieve certain types of enhanced media data based on the media device's capabilities and/or user's preferences.

SUMMARY

The invention, in various embodiments, addresses deficiencies in the prior art by providing systems, methods and devices that enable a media device to retrieve enhanced media data based on broadcast media data received from a broadcast source.

In one aspect, a personal media device includes a broadcast receiver that receives broadcast media and broadcast media data from a broadcast source where the broadcast media data include a media identifier associated with the broadcast media. The personal media device includes a data transceiver that i) sends a retrieval request to a media server for enhanced media data where the retrieval request includes the media identifier and ii) receives the enhanced media data via a wireless data channel. The media device also includes a processor, in communication with the data transceiver, that performs a media device operation in response to the received enhanced media data.

The broadcast receiver may be a FM or AM radio receiver. The media may include a song or music. The broadcast media data may include RDS data. The RDS data may include the media identifier. The media identifier may include a track identifier. The track identifier may include a track title. The track identifier may include a numeric or alpha-numeric identifier. The track identifier may include a unique identifier.

The media may include, without limitation, a video, an image, audio, audio file, multimedia, movie, television data, satellite data, and any like broadcast data. The enhanced media data may include, without limitation, album art, an album image, an album video, song art, a song image, a song video, a ringtone, a ringtone offer, music, a music offer, artist information, artist concert information, artist trivia, song trivia, song-related information, broadcast source information, an advertisement, broadcast source contact information, promotional information, contact links to related information sources, and metadata associated with the media.

The media server may include, without limitation, a clearinghouse server and a broadcast source server. The clearinghouse server may include a database that stores the enhanced media data. The broadcast source server may include a database that stores the enhanced media data.

In one configuration, a media device operation includes, without limitation, displaying an image related to the track identifier, displaying a video related to the track identifier,

displaying text related to the track identifier, displaying an advertisement, displaying a ringtone offer, displaying concert information, displaying a music offer, displaying album art, displaying metadata, and displaying a link to related information.

In another aspect, a clearinghouse system includes a data store for storing enhanced media data. The clearinghouse system includes a media server, in communications with the data store, that i) receives a retrieval request from a media device where the retrieval request includes a media identifier, ii) retrieves a portion of the enhanced media data from the data store where the portion of enhanced media data is associated with received media identifier, and iii) sends the portion of enhanced media data associated with the media identifier to the media device.

In a further aspect, an enhanced media data distribution system includes a clearinghouse server that i) assigns a unique media identifier to a media item, ii) stores enhanced media data associated with the media identifier, and iii) sends the enhanced media data to a media device in response to a retrieval request. The distribution system also includes a radio station server that receives the media identifier and a radio station transmitter that broadcasts the media item and associated media identifier.

In one configuration, the media device including a broadcast radio receiver that receives the media item and associated media identifier. The media device also includes a transceiver that sends a retrieval request including the media identifier to the clearinghouse server and receives the enhanced media data associated with the media identifier. The media device further includes a processor that performs a media device operation in response to the received enhanced media data.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects and advantages of the present invention will be apparent upon consideration of the following detailed description, taken in conjunction with accompanying drawings, in which like reference characters refer to like parts throughout, and in which:

FIG. **1** is a perspective view of a media device according to an illustrative embodiment of the invention;

FIG. **2** is a view of a media device according to an illustrative embodiment of the invention;

FIG. **3** is a communications topology including a media device according to an illustrative embodiment of the invention;

FIG. **4** shows a simplified functional block diagram of a media device according to an illustrative embodiment of the invention;

FIG. **5** shows a diagram of a distribution system for media and media data according to an illustrative embodiment of the invention;

FIG. **6** shows a diagram of a public land mobile network (PLMN) data distribution system according to an illustrative embodiment of the invention;

FIG. **7** shows a diagram of a wireless access network including an access point according to an illustrative embodiment of the invention;

FIG. **8** is a diagram of a computer processing environment including various applications or routines running within a media device according to an illustrative embodiment of the invention;

FIG. **9** includes a database and/or list associating media identifiers with enhanced media data according to an illustrative embodiment of the invention; and

FIG. **10** is a flow diagram of a process for distributing enhanced media data to a media device according to an illustrative embodiment of the invention.

DESCRIPTION OF THE INVENTION

FIG. **1** is a perspective view of a media device **100** according to an illustrative embodiment of the invention. The device **100** includes a housing **102**, a first housing portion **104**, a second housing portion **106**, a display **108**, a keypad **110**, a speaker housing aperture **112**, a microphone housing aperture **114**, a headphone jack **116**, and frame sidewall **122**. In certain embodiments, the frame sidewall **122** is the exposed portion of a frame residing within or adjacent to the housing **102** that provides structural support for the media device **100** and various internal components.

In one embodiment, the housing **102** includes a first housing portion **104** and a second housing portion **106** that are fastened together and/or to the frame sidewall **122** to encase various components of the media device **100**. The housing **102** and its housing portions **104** and **106** may include polymer-based materials that are formed by, for example, injection molding to define the form factor of the media device **100**. In one embodiment, the housing **102** surrounds and/or supports internal components such as, for example, a display **108**, one or more circuit boards having integrated circuit components, internal radio frequency (RF) circuitry, an internal antenna, a speaker, a microphone, a hard drive, a processor, and other components. Further details regarding certain internal components are discussed herein with respect to FIG. **4**. The housing **102** provides for mounting of a display **108**, keypad **110**, external jack **116**, data connectors, or other external interface elements. The housing **102** may include one or more housing apertures **112** to facilitate delivery of sound, including voice and music, to a user from a speaker within the housing **102**. The housing **102** may include one or more housing apertures **114** to facilitate the reception of sounds, such as voice, for an internal microphone from a device user.

Personal computing devices and/or media devices of this type may include a touchscreen control, such as a Pronto made available by Royal Philips Electronics of the Netherlands or a GPS receiver made available by Garmin International, Inc. of Olathe, Kans. In certain embodiments, the display **108** includes a graphical user interface (GUI) to enable a user to interact with the device **100**. The personal computing device **100** may also include an image sensor such as a camera capable of capturing photographic images and/or video images.

FIG. **2** is a view of another personal media device **200** according to an illustrative embodiment of the invention. The media device **200** includes a display **202** showing a status bar **208** and video image **204**, which may include, for example, a music video, a movie, video clip, or like video images. In one embodiment, a GUI of the display **202** includes an interface **206** that enables the media device **200** user to play, pause, fast forward, reverse, or monitor, via a slider **210**, the progress of the video displayed on the display **202** or audio being played by the media device **200**. The media device **200** includes a housing base **212**.

FIG. **3** shows a communications topology including a computer **308**, media device **300**, and a headset **302**. Media device **300** may communicate with computer **308** via communications channel **310**. Media device **300** may communicate with the headset **302** via communications channel **312**. In one

embodiment, communications channel **312** is a wired communication channel. Alternatively, the communications channel **312** may be wireless.

Media device **300** may take any form. For example, media device **300** may be a portable media player such as a portable music player. Media device **300** may also include, for example, a mobile telephone that may play downloaded media. Media may be downloaded directly to the media device **300** or may be downloaded to computer **308** and transferred to the media device **300** via communications channel **310**.

The media device **300** may include a wireless communications device such as a cellular telephone, satellite telephone, cordless telephone, personal digital assistant (PDA), pager, portable computer, or any other device capable of wireless communications. In fact, FIG. **2** shows an exemplary cellular telephone version of a broad category of media device **300**. The media device **300** may be compact, portable, mobile, personal, and/or transportable.

The media device **300** may also be integrated within the packaging of other devices or structures such as a vehicle, video game system, appliance, clothing, helmet, glasses, wearable apparel, stereo system, computer system, entertainment system, or other portable devices. In certain embodiments, the media device **300** may be docked or connected to a wireless (e.g., a wi-fi docking system) and/or radio enabling accessory system (e.g., AM/FM or satellite radio receiver) that provides the media device **300** with short-range communicating functionality and/or radio reception capability. Alternative types of media devices **300** may include, for example, a media player such as an iPod®, iPod® Nano, iPod® Shuffle, or Apple® iPhone available by Apple Inc., of Cupertino, Calif., pocket-sized personal computers such as an iPAQ® Pocket PC available by Hewlett Packard Inc., of Palo Alto, Calif. and any other device capable of communicating wirelessly (with or without the aid of a wireless enabling accessory system).

In certain embodiments, the media device **300** may synchronize with, for example, a remote computing system or server, e.g., computer **308**, to receive media (using either wireless or wireline communications paths). Wireless syncing enables the media device **300** to transmit and receive media and data without requiring a wired connection. Media may include, without limitation, sound or audio files, music, video, multi-media, and digital data, in streaming and/or discrete (e.g., files and packets) formats.

During synchronization, a host system, e.g., device **308**, may provide media to a client system or software application embedded within the media device **300**. In certain embodiments, media and/or data is "downloaded" to the media device **300**. In other embodiments, the media device **300** is capable of uploading media to a remote host or other client system.

The headset **302** may be utilized to provide an audio functionality associated with media device **300**. The headset **302** may include speakers **304** and **306** as well as a microphone.

FIG. **4** shows a simplified functional block diagram of a media device **400** according to an illustrative embodiment of the invention. The block diagram provides a generalized block diagram of a computer system such as may be employed, without limitation, by the media devices **100**, **200**, and **300**. The media device **400** may include a processor **402**, storage device **404**, user interface **406**, display **610**, CODEC **612**, bus **618**, memory **620**, communications circuitry **622**, a speaker or transducer **624**, a microphone **426**, a location sensor **430**, a radio receiver **432**, a radio receiver decoder **434**, a speaker **424**, and communications circuitry to facilitate communications with a headset **302**, other media device, or other system via a communications network. Processor **402** may control the operation of many functions and other circuitry included in media device **400**. Processor **402** may drive display **410** and may receive user inputs from the user interface **406**.

Storage device **404** may store media (e.g., music and video files), software (e.g., for implanting functions on device **400**), p reference information (e.g., media playback preferences), lifestyle information (e.g., food preferences), personal information (e.g., information obtained by exercise monitoring equipment), transaction information (e.g., information such as credit card information), word processing information, personal productivity information, wireless connection information (e.g., information that may enable media device to establish wireless communication with another device), subscription information (e.g., information that keeps tracks of podcasts or television shows or other media that a user subscribes to), radio station broadcast source information, and any other suitable data. Storage device **404** may include one more storage mediums, including for example, a hard-drive, permanent memory such as ROM, semi-permanent memory such as RAM, or cache.

Memory **420** may include one or more different types of memory which may be used for performing device functions. For example, memory **420** may include cache, ROM, and/or RAM. Bus **418** may provide a data transfer path for transferring data to, from, or between at least storage device **404**, memory **420**, and processor **402**. Coder/decoder (CODEC) **412** may be included to convert digital audio signals into an analog signals for driving the speaker **424** to produce sound including voice, music, and other like audio. The CODEC **412** may also convert audio inputs from the microphone **426** into digital audio signals. The CODEC **412** may include a video CODEC for processing digital and/or analog video signals.

User interface **408** may allow a user to interact with the media device **400**. For example, the user interface **408** can take a variety of forms, such as a button, keypad, dial, a click wheel, or a touch screen. Communications circuitry **422** may include circuitry for wireless communication (e.g., short-range and/or long range communication). For example, the wireless communication circuitry may be Wi-Fi enabling circuitry that permits wireless communication according to one of the 802.1x standards. Other wireless network protocols standards could also be used, either in alternative to the identified protocols or in addition to the identified protocol. Other network standards may include Bluetooth, the Global System for Mobile Communications (GSM), code division multiple access (CDMA), and long-term evolution (LTE) based wireless protocols. Communications circuitry **422** may also include circuitry that enables the media device **400** to be electrically coupled to another device (e.g., a computer or an accessory device) and communicate with that other device.

In one embodiment, the media device **400** may be a portable computing device dedicated to processing media such as audio and video. For example, the media device **400** may be a media device such as media player (e.g., MP3 player), a game player, a remote controller, a portable communication device, a remote ordering interface, an audio tour player, or other suitable media device. The media device **400** may be battery-operated and highly portable so as to allow a user to listen to music, play games or video, record video or take pictures, communicate with others, and/or control other devices. In addition, the media device **400** may be sized such that it fits relatively easily into a pocket or hand of the user. By being handheld, the media device **400** (or media devices **100**,

200, and 300) is relatively small and easily handled and utilized by its user and thus may be taken practically anywhere the user travels.

The media device 400 may employ a location sensor 430 to enable the media device to determine its geographic location in support of location-based services and other services. The location sensor 430 may include a global position system (GPS) receiver. The location sensor 430 may include one or more radio receivers that perform radio doppler and/or triangulation sensing to determine the media device 400 location. In certain embodiments, the location sensor 430 may be integrated with the communications circuitry 422. In one embodiment, the location sensor 430 may include a data decoder such as decoder 434 that decodes a source identifier broadcast by a radio source (e.g., radio station identifier or cellular network system identifier (SID)).

FIG. 5 shows a diagram of a media distribution system 500 according to an illustrative embodiment of the invention. The media distribution system 500 includes a media device 502, a broadcast radio station 504, a broadcast radio station 524, a public land mobile network (PLMN) 530, a PLMN 542, an access point (AP) 540, and AP 504, a data network 510, a public switched telephone network (PSTN) 552, and a clearinghouse server 516. The network 510 may include the Internet. The radio station 504 may include a radio station tower 520 that facilitates the broadcast of a broadcast radio signal 522 to a plurality of media devices including media device 502. Also, the radio station 524 may include a radio station tower 526 that facilitates the broadcast of a broadcast radio signal 528 to a plurality of media devices including media device 502.

The broadcast radio signal may be, without limitation, frequency modulated (FM) or amplitude modulated (AM). The interfaces 522 and 528 may operate in an AM frequency band of about 500-1500 kHz. The interfaces 522 and 528 may operate in an FM and/or television frequency band of about 54-1600 MHz. The interfaces 522 and 528 may operate and any number of frequency bands such as, for example, a satellite frequency band. The radio station 504 may be associated with a radio station server 506 that includes a database 508 for storing media and/or media data. The radio station 524 may be associated with a radio station server 512 that includes a database 514 for storing media and/or media data.

The PLMNs 530 and 542 may include a cellular telephone network. The PLMNs 530 and 542 may utilize a plurality of cellular radio towers 532, 538, 544, and 548 respectively. The media device 502 may exchange data and other communications with the PLMN 530 and/or 542 via a wireless communications channel 536 and/or 546 respectively. The media device 502 may exchange data and other communications with the AP 540 and/or AP 504 via a wireless communications channel 534 and 550 respectively. The clearinghouse media data server 516 may include a database 518 for storing media and/or media data.

FIG. 6 shows a diagram of a public land mobile network (PLMN) 600 according to an illustrative embodiment of the invention. A PLMN may include a wireless telecommunications network and/or a cellular telephone network such as a Global System for Mobile communications (GSM), cdma2000 system, ANSI-136 TDMA system, LTE, and like wireless communications networks. These networks may also provide data communications services such as Evolution-data only (EV-DO), General Packet Radio Service (GPRS), wireless application protocol (WAP), cellular digital packet data (CDPD), and like wireless data services.

PLMN networks are generally referred to as cellular networks because they employ a frequency re-use architecture in which wireless access channels are grouped into geographically-located cells and sectors. The size of each cell depends on the output power of the network base station (BS) transceiver, e.g., BS 602, associated with each cellular tower 532 and cell. Each access channel uses a certain frequency band in one geographic cell that is re-used in another cell, geographically separated from the first cell, by another access channel where the likelihood of interference is minimized.

These networks also use a centralized switch or server such as the mobile switching center (MSC) 604 to enable a wireless device to move from cell to cell while maintaining a persistent data connection. In the United States, cellular and Personal Communications Service (PCS) networks operate in the licensed commercial 800-900 Mhz and 1900-2100 Mhz ranges. Access data channels, however, may be bandwidth limited to 30 khz, 200 khz, or 1.24 Mhz depending on the wireless air interface standard used.

PLMN networks primarily provide voice communications while also providing relatively low rate data communications (e.g., 9.6-140 kbps). PLMN networks such as the Global System for Mobile Communications (GSM) and cdma2000 provide a Short Message Service (SMS) that enables telephone users to send relatively short, e.g., about 160 bytes, messages to other cellular telephones or to traditional electronic mail (e-mail) accounts within land-based IP networks.

A Short Message Server Center (SMSC) 606 typically coordinates with the MSC 604 to distribute SMS messages to cellular telephones and/or media devices 502. The SMSC may also interface with a wireless data server 608 to send SMS messages with destination addresses, e.g., e-mail addresses, external to the PLMN 600. The SMSC may include a mail server and/or other functionality to convert SMS messages to the proper e-mail format if necessary. Alternatively, the wireless data server may include a mail server such as a POP and/or Exchange server to facilitate the delivery of e-mail messages to and from the PLMN 600.

SMS messages may be transmitted over the air interface 120 via the traffic and/or control channels of the PLMN 600 network. While SMS messages are typically limited to about 160 bytes in length, longer text messages may be sent to or received by a media device 502. This may be performed by breaking a larger message into multiple SMS messages for delivery and then re-assembling the multiple SMS messages into the original message upon receipt. Multimedia message services (MMS) may also be employed having messages that include text, video, pictures, and audio.

Recently, PLMN providers have launched higher bandwidth data networks such as cdma2000 Evolution Data Only (EVDO) networks that provide up to 2 Mbps and Third Generation GSM (3GSM) networks that provide approximately 300 kbps data rates. These higher rate data services may employ point-to-point (PPP), simple IP and/or mobile IP (MIP) protocols to more efficiently interface with traditional IP networks such as network 510 and/or the Internet. The wireless data server 608 may function as a cdma2000 and/or GPRS Packet Data Server Node (PDSN), MIP Home Agent, MIP Foreign agent, wireless data gateway, and like systems to facilitate data communications with an external data network such as the network 510.

Using circuit-switched and/or packet-switched data services, the PLMN 600, 530, and 542 enables a media device 502 to act like a network interface to another data network such as the Internet. Thus, media device 502 may employ any of the applications and features of a standard workstation and/or home personal computer, subject to the processing speed, power, and memory constraints of a compact and mobile device. For example, the media device 502 may utilize

a WWW browser employing HTML, WML, XML, and like markup languages to facilitate access to a remote web server, e.g., server **552**, **506**, **512**, and/or **516**, via the network **510**. The media device **502** may utilize certain applications that enable the exchange of data with remote data servers connected to the network **510**. Data may be transported to and from the network **510** via the wireless data server **608**. In these instances, the wireless data server **608** exchanges data with the BS **602**. The BS **602**, in turn, transmits data to and/or receives data from the media device **502** via one or more data traffic channels on the air interface **536** or **546**.

FIG. **7** shows a diagram of a wireless access network **700** including an access point (AP) **540** according to an illustrative embodiment of the invention. A wireless access network may include any wireless network that facilitates communications from one communications device to another or to another network such as the Internet. Typical wireless access networks include 802.11, WiFi, WiMAX, Bluetooth, proprietary wireless LANs, wide area wireless networks, and like wireless access networks.

The wireless access network **700** includes an AP **540**, a wireless LAN (WLAN) **702**, router **704**, and local area network (LAN) **706**. The LAN may be connected to network **510** via one or more data networks. The WLAN **702** may be connected to the PSTN **552** via one or more network interfaces. The AP **540** may connect with one or more media devices **502**. WLAN networks, such as WLAN **702**, employ wireless APs **540** to communicate with multiple wireless devices, e.g., media device **502**, simultaneously via a set of wireless access channels.

While the wireless access network **700** may not support SMS messaging as with the PLMN **600**, the wireless access network **700** is capable of supporting relatively high data rate communications between a media device **502** and the network **510**. Furthermore, the wireless access network **700** can support higher layer protocols such as TCP/IP, HTTP, and UDP, which enable the use of a web browser and other applications at the media device **502**.

Returning to FIG. **5**, in operation, the media device **502** may move from one geographic location in the vicinity of certain wireless communications infrastructure elements to another geographic location in the vicinity of other wireless communications infrastructure elements. For example, FIG. **5** refers to media device **502** as media device **502***a* while the device is in the vicinity of radio station **504**, but then refers to media device **502** as media device **502***b* when the device is in the vicinity of radio station **524**. In other embodiments, the terms **502***a* and **502***b* can refer to different media devices.

As discussed previously, a media device **502** may include a broadcast radio receiver, e.g., radio receiver **432**, that enables the media device **502** to receive media from a plurality of radio stations, e.g., radio station **504**, within its vicinity. The media device **502** may include the capability to enable a user to configure a set of favorite radio stations and/or radio station frequencies so that the user can conveniently tune the broadcast radio receiver **432** to a favorite radio station.

In addition to the radio receiver **432**, the media device **502** may include a data transceiver as part of its communications circuitry **422** to facilitate the exchange of data with a PLMN, e.g., PLMN **530**, a wireless access network, e.g., via AP **540**, or another like wireless data network. In certain embodiments, the media device **502** may utilize a data transceiver to supplement broadcast media and/or media data received from a radio station such as radio stations **504** and **524**. In one embodiment, the media device **502** is capable of querying a clearinghouse media data server **516** via a wireless data network (e.g., PLMN or wireless access network) to obtain media and/or media data. A clearinghouse server **516** may include one or more data servers and systems that perform a network-based services via, for example, the Internet. One example of a clearinghouse media data server **512** is the iTunes® music downloading service, made available by Apple Inc. of Cupertino, Calif. Media data may include metadata and/or data about or related to media. For example, media data may include an image such as album cover art related to a song. Media data may also include information related to a broadcast source of the media such as the name of a radio station playing a song. In certain embodiments, the media device **502** can retrieve media and/or media data from a radio station server **504** and/or its associated database **508**, the clearinghouse server **516** and/or its associated database **518**, a remote web server **552**, and any other data source in communication with the network **510**.

One problem with existing broadcast radio receivers is that the amount of media data broadcast along with the media is relatively limited in size, flexibility, and scope. For example, the RDS system provides a limited amount of information such as a song title, artist name, 64-character text, a station call sign, and other information. However, the available bandwidth is so limited as to prevent the distribution of much richer media data including, for example, a graphic image of album cover art related to a song. The present invention advantageously addresses this problem by enabling a media device **502** to access a data network to supplement the limited broadcast media data and/or obtain enhanced media data associated with the media being broadcast by a broadcast radio source.

FIG. **8** is a diagram of a computer processing environment including various applications or routines running within a media device **800** according to an illustrative embodiment of the invention. The media device **800** includes a media receiver application **802**, a media data decoder application **804**, and an enhanced media data retriever application **806**. The media receiver application **802** may control the operation of various hardware and/or software functions to enable the reception of broadcast media from a broadcast radio source such as radio station **504**. The media data decoder application **804** may control the operation of various hardware and/or software functions to enable the media device **800** to decode various media data, e.g., RDS data, received from a broadcast radio source. The enhanced media data retriever application **806** may control the operation of various hardware and/or software functions to enable the media device **806** to retrieve enhanced media data via one or more wireless data networks in communication with the media device **800**.

The media device **800** may access one more remote databases such as, without limitation, databases **508**, **514**, and **518**, or other data sources such as server **552**, to retrieve the enhanced media data. In certain embodiments, the broadcast media data may include a media identifier associated with a particular media item such as a song. The media identifier may include a unique identifier. The unique identifier may be numeric and/or alpha-numeric. The media identifier may include a track identifier. By employing a media identifier, the media device **800** may query a remote server and/or database to efficiently retrieve enhanced media data that is associated with the media identified by the media identifier.

FIG. **9** includes a database **900** and/or list associating media identifiers **902** with enhanced media data **808** according to an illustrative embodiment of the invention. The enhanced media data may include, without limitation, album art, an album image, an album video, song art, a song image, a song video, a ringtone, a ringtone offer, music, a music offer, artist information, artist concert information, artist trivia,

song trivia, song-related information, broadcast source information, an advertisement, broadcast source contact information, promotional information, contact links to related information sources, metadata associated with a media item, and any like information related to the media. The database **900** may be associated with the clearinghouse server **516** and/or located at database **518**. The database **900** may be associated with a radio station server **506** and/or **512**, and located at database **508** and databases **514** respectively. The database **900** may be located at any remote source such as web server **552**. The database **900** may be a virtual and/or distributed database such that portions of the database are located at databases **518**, **508**, **514**, and other remote data sources.

FIG. **10** is a flow diagram of a process **1000** for distributing enhanced media data **908** according to an illustrative embodiment of the invention. First, a media server **516** assigns a unique media identifier **902** to a media item such as a song (Step **1002**). Then, the media server **516** stores enhanced media data **908** associated with the media identifier **902** in a data store such as database **900** (or database **518**, **508**, or **514**) (Step **1004**). A broadcast source such as radio station **504** receives the media identifier **902** via a network **510** which may include the Internet (Step **1006**). The broadcast source, e.g., radio station **504**, transmits and/or broadcasts the media item and associated media identifier **902** via wireless interface **522** (Step **1008**). A media device **502** receives the media item and associated media identifier **902** (Step **1010**). Then, the media device **502** sends a retrieval request including the media identifier **902** to the data store such as clearinghouse sever **516** and/or database **518** (Step **1012**). The retrieval request may also include media device type information and/or user preference information. The data store may determine the types or categories of enhanced media data that should be sent to the media device based on the device type or user preference information. The data store then sends the enhanced media data **908** to the media device **502** in response to the retrieval request (Step **1014**). The media device **502** receives the enhanced media data **908** associated with the media identifier **902** (**1016**). Then, the media device **502** performs an operation in response to the received enhanced media data **908**. Media device type information may include feature information about the media device such as, without limitation, processor type, display type, memory size, user interface type, audio features, video features, device purpose, and the like. User preference information may include, without limitation, preferred types of enhanced media data (e.g., concert schedules, album art, links to other source), preferred formats (audio, visual, multimedia, textual), preferred amounts of enhanced media data, and the like.

Persons skilled in the art will appreciate that the various configurations described herein may be combined without departing from the present invention. It will also be recognized that the invention may take many forms other than those disclosed in this specification. Accordingly, it is emphasized that the invention is not limited to the disclosed methods, systems and apparatuses, but is intended to include variations to and modifications thereof which are within the spirit of the following claims.

What is claimed is:

1. A system comprising:

a wireless data processing system having a broadcast receiver to receive broadcast media and broadcast media data from a broadcast source, the broadcast media data comprising a media identifier associated with the broadcast media;

a media device comprising a data transceiver and a processor, the media device being coupled to the wireless data processing system;

wherein the data transceiver is configured to send a retrieval request for enhanced media data which is available from a media server, wherein the enhanced media data is only metadata, wherein the metadata is related to the broadcast media, and wherein the enhanced media data is transmitted from the media server, the retrieval request comprising the media identifier, and the data transceiver receiving the enhanced media data via a wireless data channel, wherein the received enhanced media data is based on the sent media identifier; and

wherein the processor is coupled to the data transceiver and is configured to perform a media device operation in response to the receipt of the enhanced media data.

2. The system of claim **1** wherein the media device is integrated within a wearable apparel.

3. The system of claim **1** wherein the media device is integrated within a vehicle.

4. The system of claim **1**, wherein the broadcast receiver comprises at least one of a FM radio receiver or an AM radio receiver.

5. The system of claim **1**, wherein the received broadcast media comprises at least one of a song or music.

6. The system of claim **5**, wherein the received broadcast media data comprises at least one of Radio Broadcast Data System (RBDS) data or Radio Data System (RDS) data.

7. The system of claim **6**, wherein the RDS data comprises the media identifier.

8. The system of claim **1**, wherein the media identifier comprises a track identifier.

9. The system of claim **8**, wherein the track identifier comprises a track title.

10. The system of claim **8**, wherein the track identifier comprises at least one of a numeric or alpha-numeric identifier.

11. The system of claim **1**, wherein the broadcast media comprises at least one of a video, an image, audio, an audio file, multimedia, a movie, or television data.

12. A media device for use with a wireless data processing system which comprises a broadcast receiver configured to receive broadcast media and broadcast media data from a broadcast source, the broadcast media data comprising a media identifier associated with the broadcast media, the media device comprising:

a display;

a processor coupled to the display and coupled to the wireless data processing system;

a data transceiver coupled to the processor, the data transceiver being configured to send a retrieval request for enhanced media data which is available from a media server, wherein the enhanced media data is only metadata, wherein the metadata is related to the broadcast media, and wherein the enhanced media data is transmitted from the media server, the retrieval request comprising the media identifier, and the data transceiver receiving the enhanced media data via a wireless data channel, wherein the received enhanced media data is based on the sent media identifier; and

wherein the processor is configured to perform a media device operation in response to the receipt of the enhanced media data.

13. The media device of claim **12** wherein the media device is integrated within a wearable apparel.

14. The media device of claim **12** wherein the media device is integrated within a vehicle.

15. The media device of claim 12, wherein the broadcast receiver comprises at least one of a FM radio receiver or an AM radio receiver.

16. The media device of claim 12, wherein the received broadcast media comprises at least one of a song or music.

17. The media device of claim 16, wherein the received broadcast media data comprises at least one of Radio Broadcast Data System (RBDS) data or Radio Data System (RDS) data.

18. The media device of claim 12, wherein the media identifier comprises a track identifier.

19. The media device of claim 18, wherein the track identifier comprises at least one of a numeric or alpha-numeric identifier or a track title.

20. The media device of claim 12, wherein the broadcast media comprises at least one of a video, an image, audio, an audio file, multimedia, a movie, or television data.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.	: 9,197,338 B2
APPLICATION NO.	: 14/742913
DATED	: November 24, 2015
INVENTOR(S)	: Jeffery Lee and Michael Ignazio Ingrassia

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Specification:

Column 11

Line 30, delete "sever 516" and substitute -- server 516 --.

Signed and Sealed this
Twentieth Day of December, 2016

Michelle K. Lee

Michelle K. Lee
Director of the United States Patent and Trademark Office